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# Massachusetts Health Care Cost Trends

## Preventable Hospitalizations Appendix B. Data and Methodology

August 2012



DIVISION OF  
Health Care  
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## Data and Methodology

This analysis covers the period of Fiscal Year 2008 through Fiscal Year 2010 and uses AHRQ version 4.3 for its analysis. The data used in this analysis are from the DHCFP Inpatient Discharge Database FY08 – FY10 (10/01/07 – 09/30/2010). The data are reported quarterly by Massachusetts hospitals, and include information on total charges for services a patient incurs during a hospital stay. Charges are based on a given hospital's established rates and include daily facility, ancillary and patient care service charges.

Hospital charges alone do not provide a useful measure of the resources used for the patient's stay because the charged amount is often quite different from the actual amount paid by insurers due to variations in provider-payer contracts. Charges for a specific procedure as established by a hospital can also vary considerably between hospitals. DHCFP calculates a cost to charge ratio to smooth some of these factors based on hospital financial data reported annually. The cost to charge ratio used in this report is calculated by summing the inpatient costs for services used by patients at Massachusetts acute hospitals in a given year, divided by the sum of the charges for the services. The data come from annual cost reports filed by hospitals. This statewide inpatient cost to charge ratio is then applied to the charges associated with the PHs. When dividing the estimated cost by the volume of services, an average cost per service is derived. There is no set statewide mark-up applied to all services. However, when looking across all hospitals and all admissions, a statewide cost to charge ratio applied to charges provides a meaningful approximation of the cost of care. The cost to charge ratios for each of the fiscal years studied in this report is provided below.

Fiscal Year	CCR
2008	0.4868
2009	0.4816
2010	0.4779

In calculating the rate of preventable hospitalizations, the unit of analysis is the hospital discharge, not a person or patient. This means that a person who is admitted to the hospital multiple times in one year will be counted each time as a separate "discharge" from the hospital. Risk adjusted rates (adjusted for age and gender) are calculated at the state and county levels. Rates for age, gender, and race/ethnicity are the observed rate divided by the expected rate. The observed (or raw) rate is the number of discharges divided by the population. AHRQ software calculates the expected rates by applying the average casemix (age, gender, and diagnoses) of a baseline file that reflects a large proportion of the U.S. hospitalized or residential population from the AHRQ Healthcare Cost and Utilization Project Nationwide Inpatient Sample, a nationwide database of inpatient hospital stays.

Rates in this report are expressed per 100,000 population for those ages 18 and older (Massachusetts adult residents). For county level analysis, Dukes, Nantucket, and Franklin counties were excluded due to population sizes less than 100,000. For race/ethnicity analysis, rates are reported for non-Hispanic Blacks (Blacks), non-Hispanic Whites (Whites), and Hispanics. Other races/ethnicities were removed from analysis due to small population sizes.<sup>1</sup> The condition-specific PH rates by age group and race/ethnicity are calculated as an Observed:Expected ratio. Therefore, a rate of 104 indicates that the rate for that group is 4 percentage points higher than expected. The condition-specific PH rates by county are risk-adjusted.

<sup>1</sup> Readers should note that the rates displayed in previous Preventable Hospitalization reports released by DHCFP are not comparable to the rates displayed here due to recent updates that AHRQ applied to the PQI measures. For more information about the AHRQ PQI methodology, please refer to [http://www.qualityindicators.ahrq.gov/Modules/pqi\\_overview.aspx](http://www.qualityindicators.ahrq.gov/Modules/pqi_overview.aspx)

## Clinical Definitions of Preventable Hospitalization Conditions, as defined by AHRQ<sup>2</sup>

### Angina (without a procedure)

A severe, often constricting pain, discomfort, tightness, or pressure experienced primarily in the chest. Pain may also be felt in the left shoulder, arms, neck, back, and throat. Angina is often an early sign of coronary artery disease. While not all angina admissions are preventable, it is possible that angina can be effectively managed on an outpatient basis if diagnostic procedures and/or surgical interventions are not required.

### Asthma

Chronic lung disease characterized by an inflammation of the lungs and may involve muscle spasms and airway constriction. Common symptoms of asthma include coughing, wheezing, shortness of breath, and chest tightness. Asthma may be triggered by a host of environmental factors, including pollen, dust, smoke, exercise, illness, weather, and strong emotions.

### Bacterial pneumonia

Infection of the lungs caused by bacteria that leads to irritation, swelling, and congestion of the lungs.

### Chronic obstructive pulmonary disease (COPD)

Common name for the frequently coexisting conditions of chronic bronchitis and emphysema. Chronic bronchitis is an inflammation of the lungs that leads to swelling of the lungs and constriction of the airways. Emphysema is also an inflammation of the lungs leading to swelling that stretches and eventually breaks the walls in between the air sacs. These broken walls reduce the elasticity of the lungs and impair the exchange of oxygen and carbon dioxide.

### Congestive heart failure (CHF)

A weakness in the heart muscle, possibly caused by heart attack, heart disease, high blood pressure, or infection that reduces the ability of the heart to effectively pump blood to the body. This inability to effectively pump and circulate blood throughout the body leads to pooling of blood in the extremities and congestion in the lungs.

### Dehydration

Excessive loss of water and salt that can lead to dangerous side effects. Dehydration is usually classified as mild, moderate, and severe with symptoms. Mild and moderate dehydration are characterized by symptoms ranging from dry mouth and rapid heart beat to sunken eyes and lethargy. Severe dehydration can lead to shock, seizure, brain damage, and death.

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2 AHRQ Quality Indicators: Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions. Rockville, MD: Agency for Healthcare Research and Quality. Revision 4. (November 24, 2004).

## Diabetes

The body's inability to produce insulin (type 1 diabetes) or properly use insulin (type 2 diabetes) that has been produced. Complications from diabetes can be categorized as follows:

- *Short-term complications*—Conditions include diabetic ketoacidosis, hyperosmolarity, and coma. These life-threatening conditions occur when a patient experiences excess glucose or insulin.
- *Long-term complications*—Conditions include renal, visual, neurological, and circulatory disorders.
- *Lower extremity amputation*—Long-term circulatory problems caused by diabetes can lead to gangrene and necrosis of the muscle and skin in the legs; often, these complications will lead to the amputation of the feet and/or legs. Lower extremity amputations are often preventable with proper disease management. Hospitalizations involving these procedures signal significant problems in the quality of primary and preventive care that might have been provided earlier in the disease progression.

## Hypertension

Also known as high blood pressure, hypertension is the elevation of blood pressure to a level sufficient to cause cardiovascular damage. The official criterion for hypertension is a systolic reading of 140 or higher and a diastolic reading of 90 or higher.

## Urinary tract infection

Infection that occurs when bacteria enters the urethra. The infection may spread from the urethra to the rest of the urinary tract, including the bladder, ureters, and kidneys.



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